APPARATUS AND METHOD FOR CAPTURING AN
INFORMAL IMAGE WITH A DIGITAL CAMERA

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1. Field of the Invention

5   This invention relates to digital cameras and, more particularly, to apparatus for capturing an improved image by a digital camera.

2. Background of the Invention

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The use of digital cameras has been increasing in the past few years. The conveniences of reviewing an image before committing the image to storage as well as the ability to download images over the internet are a
15   few of the features that are particularly attractive to camera operators.

Referring to Fig. 1, a diagram illustrating the components of a digital camera 10, according to the prior art, is shown. The operation of the digital camera can be understood as follows. A user activates switch 11 in order to acquire a photographic image. The switch 11 applies an activation signal to processing unit 12. For a relatively simple digital camera, the processing unit 12 will provide the proper conditions for photo-sensitive region 15 to acquire an image, will activate the flash assembly 13, and will activate the shutter assembly 14. Activation of the shutter assembly 14 will cause an optical image to be applied to the photo-sensitive region 15. After the image has been applied to the photo-sensitive region 15, the image is converted into logic signals and is processed by the processing unit 12. In more complex systems, the external illumination level can be monitored and the processing unit 12 can control the time in which the photo sensitive region is illuminated by the subject.

However, some of the problems of attempting to capture a suitable image have remained. One particularly frustrating situation is the photographing of children. The experience of many amateur photographers is that, despite coaxing and/or a variety of artifices, the desired smile frequently appears only after the picture has been taken. Furthermore, child subjects in

particular frequently display a grimace while being photographed, the grimace typically being relatively unattractive. Once the picture has been taken, the subject children presumably relax and only then provide a

5 pleasing facial expression to the frustration of the camera operator.

A need has therefore been felt for apparatus and an associated method having the feature that a desired image

10 can be acquired in situations in which the subject has trouble in relaxing. It would be a further feature of the apparatus and associated method to provide a delayed image acquisition of the subject after a simulated image acquisition of the subject. It would be still another

15 feature of the apparatus and associated method to process a sequence of acquired images to search for the presence of a predetermined feature and to discard the acquired images until an image with the predetermined feature is identified.

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Summary of the Invention

The aforementioned and other features are accomplished, according to the present invention, by

25 providing, in one mode of operation, a timer in a digital camera. The digital camera provides a simulated exposure, including shutter and other camera noises and

providing a flash.   The simulated exposure activates the
timing mechanism.   After a preselected length of time,
the timer activates the digital camera to acquire an
image.   The preselected period of time is selected to

5   provide time for the subject to relax having assumed that
the   simulated   exposure   was   the   actual   exposure.
According   to   a   second   embodiment   of   the   present
invention, the digital camera includes a program for
general facial image recognition.   In particular, the

10   facial image recognition program permits the recognition
of preselected feature (e.g. smile) on a facial image.
In this embodiment, the activation of the timer results
in the image being periodically displayed on the photo-
sensitive region and periodically transferred to the

15   processing unit.   When the processing unit, operating
under   control   of   the   image   recognition   program,
identifies the preselected feature, the digital camera
stores the image.

20   Other   features   and   advantages   of   the   present
invention will be more clearly understood upon reading of
the following description and the accompanying drawings
and claims.

Brief Description of the Drawings

Figure 1 is diagram of a digital camera according to the prior art.

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Figure 2 is diagram of a digital camera according to a first embodiment of the present invention.

Figure 3 is a diagram of a digital camera according
10   to a second embodiment of the present invention.

Description of the Preferred Embodiment

1.   Detailed Description of the Drawings

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Referring to Fig. 2, a diagram of the digital camera according to a first embodiment of the present invention is shown. Added to the components shown in Fig. 1 is a mode select switch accessible to the user.   The mode
20   select switch 21, when activated, applies a signal to the timing unit 22. The mode select switch 21 also applies a signal to the processing unit such that, when the switch 11 is activated, the components of the digital camera respond by imitating the acquisition of an image.
25   However, the actual image is acquired after the preselected time in response to a signal from the timing unit to the processing unit 12.

Referring to Fig. 3, a diagram of the components for implementation of a second embodiment of the present invention is shown. This embodiment includes a timing

5   unit 32, as does the first embodiment. In addition, stored in memory portion 12A of the processing unit 12 is the pattern recognition program. Moreover, the use of the timing unit 32 is different than the use of the timing unit 22. When the alternative mode is selected by

10   the mode switch 21, the activation of switch 11 results in the transfer of the pattern recognition program to the processing unit 12 and in a series of images being acquired on the photo-sensitive region 15. The activation of the alternative mode results in the

15   processing by the pattern recognition program each image transferred to the processing unit 12. In this embodiment, each acquired image is processed to determine whether a predetermined feature, e.g., a smile on a face, is present. The identification of the predetermined

20   feature results in a signal being applied to the timing unit 32 inactivating the unit. The image having the predetermined feature is then stored in the processing unit memory for further disposition by the user.

2. Operation of the Preferred Embodiment

The present invention permits the acquisition of an image having desired features. According to one embodiment, a false image acquisition cycle is used to permit the subjects to relax and provide a more natural image. A real image is then acquired by the camera. Such a stratagem is most clearly directed toward children but can also be of use in boisterous situations. In the second embodiment, a series of images are acquired, but all the images are analyzed to detect the presence of a predetermined feature. When that feature is identified, then the process is halted and the image having the predetermined feature is stored.

As will be clear, care must be taken that when the flash unit is activated for an actual exposure that the unit is fully discharged. In the first embodiment of the invention, the simulated exposure can be accompanied by a partial discharge of the flash unit, thereby permitting a more rapid recovery period. In the second embodiment, a somewhat more complicated strategy for the flash assembly can be used because of the sequence of exposures. A pattern recognition of the predetermined feature of the image can be possible without a flash or with reduced flash intensity. Thus, having identified the

predetermined feature, the time to recharge the flash assembly for optimum image acquisition can be minimized.

5   In order to explain the operation of the present invention, the timing unit has been shown as a separate element.   In practice, timing apparatus within the processing unit 12 can be used.

10   With respect to the implementation of a pattern recognition program, the digital signal processors currently included in digital cameras have the processing and storage capability to implement pattern recognition programs.

15   While the invention has been described with respect to the embodiments set forth above, the invention is not necessarily limited to these embodiments.   Accordingly, other embodiment variations, and improvements not described herein, are not necessarily excluded from the 20   scope of the invention, the scope of the invention being defined by the following claims.